five hundred feet, the shortest time in passing a given point being ten seconds. Five buildings were destroyed, entailing a loss estimated at $25,000.

Windsor, Alachua county, Florida: a tornado occurred at this place at 12 m. on the 11th. It moved in an east-northeasterly direction at the rate of forty miles per hour, destroying four buildings, and injuring several others during its passage.

Lane Park, Sumter county, Florida: a tornado occurred a short distance east of this place on the morning of the 11th. The tornado moved in a northeasterly direction, leaving a well-marked path, about one hundred yards wide, through the timber; the largest pine and cypress trees were torn up by the roots.

Captain Charles Haley, of the schooner "Genevieve," at Philadelphia, November 9th, from Charleston, South Carolina, reports the following:

On October 29th, at 10 a. m., when about thirty miles south of Frying Pan Lightship, was struck by a tornado aloft, which carried away the main and mizzen masts about twenty-feet below the cross-trees. The weather at the time was moderate, and the wind on deck did not exceed a five-knot breeze, the only indications of a change being a rain-squall from the northwest. Four hours after the tornado we had a gale from the west which continued twenty hours.

Philadelphia, Pennsylvania, 29th: a heavy thunder-storm began at 6.35 p. m., and continued for one hour. The peals of thunder, and the electrical display, were very unusual. Considerable damage was done by lightning in this city and in Camden, New Jersey All of the electric lights were extinguished, and telegraphic communication was rendered difficult.

NAVIGATION.

STAGE OF WATER IN RIVERS.

In the following table are shown the danger-points at the various river stations; the highest and lowest stages for October, 1885, with the dates of occurrence, and the monthly ranges:

Heights of rivers above low-water mark, October, 1885.

[*Expressed in feet and tenths.*]

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
Red River:						
Shreveport, Louisiana	29 9	1, 2, 3	3 2	24	0 7	2 5
Arkansas River:						
Fort Smith, Arkansas	22 0	8	4 2	16, 18	2 7	1 5
Little Rock, Arkansas	23 0	1	4 8	26 to 30	3 3	1 5
Missouri River:						
Yankton, Dakota	24 0	1, 2, 3	14 0	29,30,31	11 6	2 4
Omaha, Nebraska	18 0	1, 2, 3	6 5	9, 10, 11, 13	5 7	0 8
Leavenworth, Kansas	20 0	19	7 3	10,11,12	6 5	0 8
Mississippi River:						
Saint Paul, Minnesota	14 5	1,13,16, 17, 19	3 4	25	2 9	0 5
La Crosse, Wisconsin	24 0	1, 2	4 8	30, 31	3 7	1 1
Dubuque, Iowa	10 0	1	5 0	15 to 19	3 8	1 8
Davenport, Iowa	15 0	1, 2	4 7	18	2 8	1 9
Keokuk, Iowa	14 0	1	6 3	15 to 18	3 9	2 4
Saint Louis, Missouri	32 0	1	12 5	18	8 8	3 7
Cairo, Illinois	40 0	28	15 0	20	8 4	6 6
Memphis, Tennessee	34 0	1	9 5	22	5 0	4 4
Vicksburg, Mississippi	41 0	1	18 2	26, 27	4 9	13 3
New Orleans, Louisiana*	—3 0	1	—10 1	25,29,30	—13 7	3 6
Ohio River:						
Pittsburg, Pennsylvania	22 0	16	7 5	2, 3, 4	0 8	6 7
Cincinnati, Ohio	50 0	20	17 1	11, 12	3 9	13 2
Louisville, Kentucky	25 0	22, 23	7 7	11	2 7	5 0
Cumberland River:						
Nashville, Tennessee	40 0	31	5 2	1	0 9	4 3
Tennessee River:						
Chattanooga, Tennessee	33 0	31	15 5	12	2 0	13 5
Monongahela River:						
Pittsburg, Pennsylvania	29 0	16	7 5	2, 3, 4	0 8	6 7
Savannah River:						
Augusta, Georgia	32 0	14	17 8	11	6 1	11 7
Mobile River:						
Mobile, Alabama	.....	19	16 8	4	15 2	1 6
Sacramento River:						
Red Bluff, California	.....	1 to 21	0 4	22 to 31	0 3	0 1
Sacramento, California	.....	19 to 24	7 7	1 to 17, 26 to 31	7 5	0 2
Willamette River:						
Portland, Oregon	.....	29	3 5	20	0 3	3 2
Colorado River:						
Yuma, Arizona	.....	.....	.....	.....	.....	.....

* Below high-water mark of 1874 and 1883.

The observer at Nashville, Tennessee, reports that the first steamer of the season from the Ohio River arrived at that place on the 28th. At the end of the month navigation for the fall season was resumed.

The Tennessee River at Chattanooga rose about ten feet during the last two days of the month.

FLOODS.

Sanford, Florida: more than six inches of rain fell at this place on the 10th, flooding the greater part of the town and the lowlands in the vicinity. Considerable damage was done to railroads, highways, bridges, etc. Lake Monroe rose three feet during the storm.

Savannah, Georgia: the high easterly and northeasterly winds during the 11th caused a remarkably high tide, which swept over the adjacent lowlands, causing great damage to the rice crop. The water in the Savannah River reached a stage eighteen inches higher than at any time since the flood of August, 1881.

Reading, Pennsylvania, 17th: the recent heavy rains caused a break in the Schuylkill Canal, near Birdsborough, and resulted in the flooding of the adjacent farms, some of the fields being covered to a depth of three feet.

Burlington, Vermont: the heavy rain on the 21st caused a rise of five feet in the Winooski River. A temporary bridge, connecting Burlington and Winooski, was washed away, entailing a loss of $1,000.

Sharon, Mercer county, Pennsylvania, 23d: the recent heavy rains caused the Shenango River to rise to an unusual height, causing a large amount of damage to the property of the Sharon water company.

Harrisonburg, Rockingham county, Virginia: the heaviest rainfall for many years occurred on the 29th and 30th. All streams were much swollen, and several washouts occurred along the Valley Branch of the Baltimore and Ohio railroad.

Richmond, Virginia, 30th: a high stage of water occurred in the James River on this date, submerging wharves in the lower part of the city; no serious damage resulted.

Lynchburg, Virginia: the remarkably heavy rainfall of the 28th and 29th caused destructive freshets in the streams in this part of the state. Much damage was done to railroad tracks and bridges. Reports from Fredericksburg state the flood in the Rappahannock River at that place caused damage estimated at $10,000.

Charleston, West Virginia: the Kanawha River rose rapidly during the morning of the 31st, sweeping away a large number of loaded barges along the river in this vicinity, causing the loss of about 500,000 bushels of coal. The losses are estimated at $150,000.

HIGH TIDES.

Smithville, North Carolina: the unusually high tide on the 12th submerged the entire water-front of this place; a few stores were flooded.

Wilmington, North Carolina: the highest tide for ten years occurred on the 12th.

Washington City: the tide in the Potomac was unusually high between 7 and 8 a. m. on the 12th.

Cape May, New Jersey: an unusually high sea caused considerable damage along the water-front at this place on the 25th.

High tides were also reported, as follows:

New River Inlet, North Carolina, 10th, 11th, 12th, 29th, 30th, 31st.

Cedar Keys, Florida, 11th.

Fort Macon, North Carolina, 12th, 27th, 28th, 29th.

Chincoteague, Virginia, 12th, 13th.

Ocean City, Maryland, 12th, 13th, 29th.

New York City, 13th.

VERIFICATIONS.

INDICATIONS.

The percentages of indications verified for September, 1885, (which were not published in the REVIEW for that month), and those for October, 1885, will be published hereafter.

The percentages of verifications of special predictions for certain localities are, as follows:

Omaha, Nebraska (twenty-seven days), 89.35; Alabama (twenty-seven days), 85.65; Tennessee (twenty-seven days), 88.00; Georgia, twenty-seven days), 88.94; Baltimore, Maryland, 76.61; Washington City, 77.82; Erie, Pennsylvania, 72.58; Boston, Massachusetts, 77.82; New Haven, Connecticut, 76.21; Portland, Maine, 77.42; Albany, New York, 76.61; Pittsburg, Pennsylvania, 72.58; Cincinnati, Ohio, 70.16; Louisville, Kentucky, 77.82; Columbus, Ohio, 70.97; Cleveland, Ohio, 73.39; Indianapolis, Indiana, 75.81; Oswego, New York, 72.98; Rochester, New York, 73.79; Buffalo, New York, 80.65; Milwaukee, Wisconsin, 70.56; Chicago, Illinois, 66.53; Detroit, Michigan, 77.92; Toledo, Ohio, 77.82; Sandusky, Ohio, 79.03; Cairo, Illinois, 74.60; Saint Louis, Missouri, 70.16; Memphis, Tennessee, 85.89: Shreveport, Louisiana, 85.48.

CAUTIONARY SIGNALS.

During October, 1885, one hundred and twenty-seven cautionary signals were ordered. Of these, one hundred and nine, or 85.83 per cent., were justified by winds of twenty-five miles or more per hour, at or within one hundred miles of the station. Twenty-five cautionary off-shore signals were ordered, of which number, twenty-two, or 88.00 per cent., were fully justified both as to direction and velocity; and all, or 100 per cent., were justified as to direction. One hundred and fifty-two signals of all kinds were ordered, one hundred and thirty-one, or 86.18 per cent., being fully justified. These do not include signals ordered at display stations where the velocity of the wind is only estimated. Of the twenty-five cautionary off-shore signals, fifteen were changed from cautionary signals. Four signals were ordered late. In sixty-nine cases winds of twenty-five miles or more per hour were reported for which no signals were ordered.

COLD-WAVE SIGNALS.

During October, 1885, there were ninety-three cold-wave signals displayed, of which number seventy-two, or 77.4 per cent. were justified.

As evidence of the value of cold-wave signals, and the favor with which these warnings are received by the general public, the following extracts from the reports of Signal Service observers, and from other sources, are given:

The meteorological committee state that "the establishment of the cold-wave warning signal at Jacksonville is highly appreciated by the board of trade and by the citizens of Florida, generally."—*Report of observer, Jacksonville, Florida.*

The cold-wave warnings are of vast benefit to the farmers and citizens here. Both the press and public are pleased that these warnings are given. The signals have brought the service and its workings prominently before our people.—*Report of displayman, Logansport, Indiana.*

The benefits derived from these warnings are very general to all classes. Shippers of perishable produce and dealers in fresh meats are greatly benefitted. The warnings are duplicated by flag at Richmond Mills (eight miles south of the city), and give great satisfaction to the farmers and millers in that vicinity.—*Report of observer, Rochester, New York.*

Great interest is manifested by the public. During displays visitors are almost continuously in the office after information. Shippers of goods, coal and river men, and people of all avocations are interested in these warnings.—*Report of observer, Pittsburg, Pennsylvania.*

The warnings are of especial benefit to gardeners, roofers, dealers in oysters, fruit, and vegetables, farmers, ice-packers, railroad companies, and dealers in live-stock.—*Report of observer, Saint Louis, Missouri.*

The service has been very accurate in these warnings. The public now have unbounded confidence in the weather department. The observer is often consulted by interested parties, and great benefit is derived.—*Report of observer, Cleveland, Ohio.*

I consider the cold-wave signal of more practical benefit to the public at large than any recent improvement in the United States Signal Service. I know, personally, of many instances during the past winter where farmers were saved from serious losses in the shipment of potatoes and apples by the timely warning of the cold-wave signal. Other instances I know, by report, where losses were sustained in the shipment of live stock (cattle and hogs) by neglecting or disregarding the warning. Our citizens and farmers have learned to rely on the forecasts given almost implicitly, and it is not too much to say that, in my judgment, the property saved by its use during the past severe winter in the Mississippi Valley would pay for its maintenance for a generation.—*Extract from a letter from Hon. J. F. Webb, mayor of Lebanon, Illinois.*

RAILWAY WEATHER SIGNALS.

Prof. P. H. Mell, jr., director of the "Alabama Weather Service," in the report for October, 1885, states:

The verification of predictions for the whole area was 93 per cent. for temperature and 86 per cent for weather.

The following roads comprise this system: Western of Alabama; South and North; Montgomery and Mobile; Mobile and Girard; Georgia Pacific; East Tennessee, Virginia and Georgia system in Alabama; Memphis and Charleston; Columbus Western; Atlanta and West Point of Georgia; Northeastern of Georgia; Atlanta and Charlotte Air Line; Western and Atlantic; Georgia; East Tennessee, Virginia and Georgia system in Georgia; and Savannah, Florida and Western.

Prof. Benjamin F. Thomas, director of the "Ohio Meteorological Bureau," in the report for October, 1885, says:

The verification of railway signals for the month was as follows: For temperature, 96 per cent.; for weather, 89 per cent.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Point Judith, Rhode Island, 6th: a brilliant auroral display was observed from 11 p. m. until midnight.

Mount Washington, New Hampshire, 8th: an aurora was observed at 9.45 p. m., consisting of two arches of pale straw-colored light. The upper arch disappeared at 10.20 and the lower one at 11 p. m.

Poplar River, Montana, 8th: at 9.05 p. m. a diffuse auroral light appeared in the north and continued without change until 11.30 p. m., when it disappeared.

Saint Vincent, Minnesota, 8th: an irregular auroral arch formed in the northern sky at 9 p. m.; it extended from 170° to 240° azimuth and had an altitude of 25°; the display was not bright; occasionally a few beams shot upward from the arch to an altitude of 10°.

Fort Totten, Dakota, 8th: an aurora was observed at 10.10 p. m., reaching an altitude of 30° and covering 150° of the horizon; at intervals an indistinct arch, with shooting beams, was visible; the display ended at 2.15 a. m. of the 9th.

Escanaba, Michigan, 8th: a faint aurora was observed from 7.58 to 10.40 p. m.

Fort Buford, Dakota, 8th: an aurora appeared at 7.40 p. m.; it consisted of an arch which extended from north-northwest to northeast, and to an altitude of 15°; it was most brilliant at 8.14 when the light extended upward 25°; after the latter hour it gradually faded.

Burlington, Vermont, 11th: an auroral light, extending from northwest to northeast, and to an altitude of 20°, was observed from 7.30 to 11 p. m.

Mount Washington, New Hampshire, 11th: an aurora was observed at 9.55 p. m., consisting of occasional streamers shooting upward from a base of light in the north, and converging at the zenith; at 11.40 p. m. the display was still visible though less brilliant, and at midnight it had entirely disappeared.

Mackinaw City, Michigan, 11th: at 7.30 p. m. there appeared a faint auroral light of pale pink color, reaching an altitude of 20° and covering 50° of the horizon. The display continued until 12.20 a. m., when the sky was obscured by clouds.

Marquette, Michigan, 12th: an aurora, resembling the morning dawn, was observed at 1 a. m.

Moorhead, Minnesota, 13th: a faint aurora was observed from 10.30 to 11.50 p. m.; it consisted of a pale light in the north extending to an altitude of 15°.

Fort Totten, Dakota: an aurora, consisting of a pale yellow color, extending to an altitude of 20° and covering 100° of the horizon, was observed from 10 p. m. to midnight. A faint auroral display was also observed on the 14th from 10.15 to 11.50 p. m.

Mount Washington, New Hampshire, 15th: a brilliant aurora was observed at 10.55 p. m.; the light was of an intense greenish color, and illuminated the mountain as brightly as though the full moon shone.

Alpena, Michigan, 15th: an aurora was first noticed at 10.10 p. m., consisting of a few faint streamers, which appeared and disappeared at intervals until 10.50 p. m., when they were last observed.